

CLAIMS

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1.-3. (cancelled)

4. (currently amended) A method for forming a contact to a semiconductor substrate of a first conductivity type, comprising:

providing a semiconductor stack including an active layer formed on a first insulator layer and a masking layer over the active layer, wherein the first insulator layer is formed on the semiconductor substrate and wherein the active layer and the masking layer are patterned to have an opening;

implanting the semiconductor substrate through the opening and the first insulator layer with a first species to form a first doped region within the semiconductor substrate, wherein the first doped region is the first conductivity type and is more heavily doped than the semiconductor substrate, and wherein the masking layer operates as a mask to the implanting;

after the implanting, forming a gate dielectric on the active layer;

forming a gate electrode on the gate dielectric;

forming a source region in the active layer adjacent a first side of the gate electrode;

forming a drain region in the active layer adjacent a second side of the gate electrode, wherein the second side is opposite the first side; and

forming a first contact electrically connected to the first doped region.

5. (cancelled)

6. (original) The method of claim 4, wherein the first dopant species is p-type.

7. (original) The method of claim 6, wherein the first dopant species is boron.

8. (original) The method of claim 7, wherein first dopant is doped using the implanting uses an energy of approximately 100KeV.

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9. (original) The method of claim 4, further comprising:
- forming an interlayer dielectric layer over the second insulator layer and the active layer and the first doped region;
  - etching a first opening in the interlayer dielectric layer;
  - filling the first opening with a metal to form a second contact electrically connected to the active layer; and
  - wherein forming a first contact further comprises:
    - etching a second opening through the interlayer dielectric layer, the second insulator layer, and first insulator layer; and filling the second opening with the metal.

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10. (currently amended) A method of forming a contact to a semiconductor substrate of a first conductivity type, comprising:

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- providing a semiconductor stack including an active layer formed on a first insulator layer, wherein the first insulator layer is formed on the semiconductor substrate;
- forming a gate dielectric over the active layer;
- forming a gate electrode over the gate dielectric;
- forming source and drain regions in the active layer and adjacent the gate electrode as to form a channel region underneath the gate electrode;
- removing a portion of the active layer;
- forming a second insulator layer adjacent the active layer and on the first insulator layer;
- forming a doped region within the substrate before forming the gate electrode and after providing the semiconductor stack, wherein the doped region is the first conductivity type and is more heavily doped than the semiconductor substrate sufficiently heavily doped to be able to form the contact;
- forming a first opening in the second insulator layer and the first insulator layer; and
- forming a conductive material within the first opening.

11. (cancelled)

12. (cancelled)

13. (original) The method of claim 10, further comprising forming a second opening and filling the second opening to form a contact that is electrically connected to the active layer.

14. (original) The method of claim 10, wherein the doped region is p-type.

15. (original) The method of claim 14, wherein the doped portion region is formed by ion implanting boron at an energy of 100KeV.

16. (original) The method of claim 10, wherein the semiconductor stack is silicon-on-insulator.

17. (currently amended) A method of forming a contact to a semiconductor substrate of a first conductivity type, comprising:

providing a semiconductor stack including an active layer formed on a first insulator layer, wherein the first insulator layer is formed on the semiconductor substrate;  
removing a portion of the active layer to form an opening in the active layer;  
forming a second insulator layer adjacent the active layer and on the first insulator layer;  
forming an a contact opening in the second insulator layer and the first insulator layer;  
forming a conductive material within the contact opening;  
forming a doped region within the semiconductor substrate under the area of the opening by implanting through the opening in the active layer before forming the conductive material within the opening second insulator layer, wherein the doped region is the first conductivity type and is more sufficiently heavily doped than the substrate to be able to form the contact to the conductive material; and  
forming a transistor in the active layer after forming the doped region.

18. (withdrawn)

19. (withdrawn)

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20. (withdrawn)

21. (withdrawn)

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